

AMENDMENT

Serial Number: 10/761,554

Filing Date: 21 January 2004

Title: Apparatus and Method for Cooling an Axle

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Atty Docket No.: 13505A-1

REMARKS

Applicant has carefully reviewed and considered the Office Action mailed on 09/22/2004, and the references cited therewith.

Claims 18-20 are pending in the present application. Claim 18 is amended herein. Claims 21-33 are added by the present amendment.

Section 102 Rejection of Claims 18-20

Claims 18-20 were rejected under 35 USC 102 as being anticipated by Carlson et al. (US 5,931,218). The grounds for the rejection were as follows:

Carlson et al. shows, in Figs. 1-6, a method of cooling an axle assembly of the work vehicle, wherein the axle assembly includes an axle shaft (inherent), and axle housing 12, 18, 22, configured to substantially surround the axle shaft, a cooling coil 42 housed within the axle housing and having a passage therethrough and outer and inner surfaces, a lubricating fluid disposed within the axle housing, and a cooling fluid disposed within the passage, and further wherein the lubricating fluid is of a higher temperature than is the outer surface of the coil and the outer surface of the coil is of a higher temperature than is the cooling fluid, the method comprising steps of;

removing heat from the lubricating fluid by placing the lubricating fluid in contact with the outer surface of the coil;

removing the heat from the inner surface of the coil by circulating the cooling fluid through the passage;

directing flow of cooling fluid to the coil by using a back pressure regulating valve 134 to impose a pressure difference across the coil; and

removing the heat from the cooling fluid by circulating the cooling fluid through a heat exchanger.

The applicants respectfully traverse the Examiner's rejection of the claims.

The Carlson reference

The Carlson patent is entitled "Apparatus and Method for Cooling an Axle Assembly". Carlson describes a conduit assembly 42 including a plurality of tubes that terminate at two plates. Thirty-four of the tubes arranged in parallel simultaneously conduct fluid from a first plate to a second plate, and thirty-four more tubes conduct the fluid back from the second plate to the first plate. A fluid inlet and a fluid outlet are fixed to the first plate. The second plate defines a chamber that joins all 68 tubes together permitting fluid to flow from the first 34 tubes to the second 34 tubes.

The conduit assembly is bent to extend around the differential located in the central housing 12. A left axle housing 18, and a right axle housing 22 are fixed to left and right sides of the central housing 12.

A heat exchanger 128 is connected in series with the conduit assembly 42, such that all fluid must first pass through heat exchanger 128 to be cooled before it enters conduit assembly 42.

Arguments

Regarding claim 18, Carlson does not disclose the step of "removing heat from the lubricating fluid by placing the lubricating fluid in contact with the outer surface of the coil wherein the outer surface of the coil is disposed between a brake assembly and a differential gearset" as recited by claim 18. Claims 19 and 20 depend from claim 18 and therefore are allowable for the same reasons.

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Support for the Amendments

The specification on page 5, lines 15-17 discusses the fin and dimples structures that make up the coil. Figure 1 shows both the left side and the right side coils disposed entirely underneath the left and right axle shafts, respectively. Figure 1 shows two cooling coils: a left side cooling coil disposed in a left axle housing and a right cooling coil disposed in a right axle housing. The method of heat removal is the same for both coils, therefore support for removing heat using a "second cooling coil" in addition to a "cooling coil" can be found in claim 18 as originally filed. The top half of page 5 explains the different ways the cooling coils can be formed. Figures 1 and 2 of the specification describes the multiple disk brakes and how they heat the lubricating oil in the axle assembly. See also the bottom of page 4 to the top of page 5 for discussion of the brakes and how they heat the lubricating oil. See Figure 1, which shows where the brakes are located within the axle assembly. Figure 1 shows a cooling coil on the left side of the vehicle disposed between a left brake and a differential gearset. Figure 1 also shows a cooling coil on the right side of the vehicle disposed between a right brake and the differential gearset.

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Conclusion

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney at 901-309-3068 to facilitate prosecution of this application.

Respectfully submitted,

/Stephen Michael Patton #36235/

Date: December 22, 2004

Stephen M. Patton
Reg. No. 36,235

Patton IP
7881 Grove Court East
Germantown, TN 38138

Phone: 901-309-3068
Fax: 901-756-9489
Email: SMPatton@PattonIP.com

CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Mail Stop Amendment, Commissioner of Patents, P.O.Box 1450, Alexandria, VA 22313-1450, on this 22nd day of December, 2004

Stephen M. Patton

/Stephen Michael Patton #36235/

Name

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